

GENERAL SERVICES ADMINISTRATION
Washington, DC 20405

November 19, 1993

FIRMR BULLETIN C-35

TO: Heads of Federal agencies

SUBJECT: Energy-efficient microcomputers and associated
computer equipment

1. Purpose. This bulletin describes procedures that will promote energy-efficiency in the acquisition, management, and use of microcomputers and associated computer equipment.

2. Expiration date. This bulletin contains information of a continuing nature and will remain in effect until canceled or superseded.

3. Contents.

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4. Related material.

The Energy Policy Act of 1992 (Public Law 102-486),
October 5, 1992.

Executive Order 12759, Federal Energy Management,
April 17, 1991.

Executive Order 12845, Requiring Agencies To Purchase Energy
Efficient Computer Equipment, April 21, 1993.

Office of Management and Budget Office of Federal Procurement

TC 90-7

Attachments

FEDERAL INFORMATION RESOURCES MANAGEMENT REGULATION
APPENDIX B

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Policy Letter 92-4, Procurement of Environmentally-Sound and Energy-Efficient Products and Services, November 7, 1992.

Federal Acquisition Regulation (FAR), Subpart 23.2, Energy Conservation.

FIRMR Part 201.20, Acquisition.

GSA Guidelines on the Acquisition, Management, and Use of Energy-Efficient Microcomputers, July 1993.

President's Policy on Technology for America's Economic Growth, February 22, 1993.

5. Information and assistance. Additional information on the content of this bulletin may be obtained from:

General Services Administration
Regulations Analysis Division (KMR)
18th and F Streets, NW
Washington, DC 20405
Telephone: FTS/Commercial (202) 501-3194 (v) or
FTS/Commercial (202) 501-0657 (tdd).

6. Definitions.

"Energy-efficient computer equipment" means computer equipment that provides equivalent or better performance and value to users, but uses significantly less energy than competing models.

"Energy Star Computer" means a microcomputer configuration which would qualify under the terms and conditions of the EPA Energy Star memorandum of understanding.

"Power management" means a hardware or software function in which equipment monitors its operation and automatically takes steps to reduce to lower power consumption depending on operating modes.

"Significant cost differential" means the additional costs incurred by purchasing Energy Star microcomputer equipment are greater than the calculated total energy savings costs over the life cycle of the microcomputer equipment.

"Sleep mode" (also called "suspend" or "standby" mode or other similar term) means a lower level power consumption mode than the normal operating mode, that equipment automatically switches to after a designated period of time. The lower level power mode terminology and actual power use will vary with the product, and some products may have more than one low power state.

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7. Acronyms.

CRT Cathode ray tube
DOE Department of Energy
EPA Environmental Protection Agency
FAR Federal Acquisition Regulation
FIP Federal information processing
kwh/yr Kilowatt hours per year
LAN Local area network
LCD Liquid Crystal Display
MAS Multiple Award Schedule
OMB Office of Management and Budget

8. Background.

a. The Federal Government currently has an inventory of roughly two million microcomputers. These microcomputers and their associated equipment account for the highest increase in energy usage in Federal buildings in recent years. Some of this increase is unnecessary. Research indicates that approximately 33% of the nation's microcomputers are left "on" at night and through the weekend.

b. Both the President and Congress have recognized the need for Federal agencies to control their use of energy resources. As an example, the Energy Policy Act of 1992 now requires Federal agencies to reduce energy consumption to 20% below 1985 levels by the year 2000. The Energy Policy Act of 1992 also directs that GSA, along with the Department of Defense and the Defense Logistics Agency initiate a "program to include energy-efficient products in carrying out their procurement and supply functions." Executive Order 12845 requires that Federal agencies procure microcomputer equipment that meets the EPA Energy Star Computers Program requirements for energy-efficiency.

c. Advances in technology have made it possible to dramatically reduce computer related energy use. Power management features have been available in notebook computers for several years and are now also available in desktop models. Although these features differ among various vendors' products, they all save energy. In some cases, energy-efficient microcomputers and associated computer equipment have other advantages such as reducing machine fan noise and heat emitted by these machines.

d. Widespread Federal agency use of power management or energy-efficient features will create other benefits such as reducing Federal Government energy costs; decreasing air pollution caused by utility power generation; and easing the burden on building air conditioning and electrical systems.

9. Energy Star requirements under Executive Order 12845.

a. EPA's Energy Star Computers Program promotes the development of energy-efficient microcomputers, monitors, and printers and the reduction of air pollution caused by power generation. Manufacturers who meet the Energy Star requirements can designate their products as Energy star compliant and use the EPA Energy Star logo. Computer products can be Energy Star qualifying without having a "logo" on the computer equipment.

b. To qualify for the EPA Energy Star, microcomputers and monitors must be able to power down to and recover from a low-power state of 30 watts or less when inactive (or 60 watts when the monitor is included in the computer casing and is not powered directly from the wall outlet). Printers must be able to power down and recover from a low-power state of 30-45 watts, depending on the print speed. Many companies expect to convert a majority of their product lines to meet the EPA Energy Star requirements within the next several years. Energy Star products must meet EPA requirements when they are shipped (i.e. delivered) to the agency. For more information on participating companies, contact the EPA Energy Star Computers program office at (202) 233-9114.

10. GSA responsibilities for energy efficiency.

a. Established to implement the Energy Policy Act of 1992, GSA's Governmentwide program on energy efficiency will:

(1) Issue Governmentwide guidance on energy efficiency for FIP resources.

(2) Assist agencies to determine the commercial availability of energy efficient computer equipment when requested.

(3) Coordinate the FIP energy-efficient policies and programs of the various GSA organizations.

(4) Provide special training sessions on the procurement of energy-efficient computer equipment in Governmentwide forums and conferences and generally promote awareness of energy efficiency through the Trail Boss Program.

(5) Identify and promote energy-efficient microcomputers and computer equipment by:

(i) Incorporating in future solicitations of the non-mandatory MAS Program for FIP resources, provisions for

inclusion of Energy Star qualifying products. The Energy Star logo or another appropriate symbol will identify the product. The MAS electronic bulletin board will also be modified to make it easy to identify and select Energy Star qualifying equipment.

(ii) Working with Federal agencies to modify in-place computer contracts to include energy-efficient models, when appropriate.

(iii) Assisting EPA in promoting their Energy Star Computers Program to the vendor community.

(6) Work with DOE and other Federal agencies to develop ways to track the implementation of energy efficient policies and the performance of FIP energy efficient equipment. GSA will also assist in disseminating information from DOE's voluntary energy performance testing program to the Federal community.

b. GSA will prepare a consolidated annual report for the President as required by Executive Order 12845. The report will include a compilation of all agency acquisitions that were reported to GSA as being exempted from the requirements of this Executive Order. The first annual report will be submitted to the President by December 31, 1994.

11. Agency responsibilities for energy efficiency.

a. In accordance with Executive Order 12845, agency officials must take the following actions:

(1) Ensure that all new contracting actions or awards for microcomputers, monitors and printers issued after October 18, 1993, contain specifications that meet "EPA Energy Star" requirements for energy efficiency.

(2) Require that microcomputers, monitors and printers be equipped with or meet the energy-efficient low-power standby feature as defined by the EPA Energy Star program unless the equipment always meets EPA Energy Star efficiency levels. This low-power feature must be activated when the computer equipment is delivered to the agency and must be capable of entering and recovering from the low-power state unless the equipment meets the EPA Energy Star requirements at all times.

(3) Include to the extent possible, practical, and permitted by law, specifications that meet the above Energy Star requirements in amendments to existing solicitations or modifications to existing contracts.

(4) Include information about the economic and environmental benefits of the energy efficient low-power standby feature in routine computer training classes.

(5) As required, grant on a case-by-case basis, exemptions to the EPA Energy Star requirements for acquisitions based upon the commercial availability of qualifying equipment, the significant cost differential of the equipment, the agency's performance requirements, or the agency's mission. These exemptions must be signed by the agency head or designee. Agencies shall periodically review their exemptions with the intent of bringing all purchases into compliance with Energy Star qualifying products.

b. Agencies must include requirements for energy efficiency in their requirements analyses in accordance with FIRMR Part 201-20. The guidance found in paragraph 12 below and in Attachment A should be used in developing requirements.

c. Beginning in 1994, agencies must report to GSA annually, by October 18, all the acquisitions, for the fiscal year ending September 30, that were exempted from the requirements of Executive Order 12845. Agencies that do not grant any exemptions must submit negative reports. The Interagency Report Control Number for the EPA Energy Star Exemption Report is 0412-GSA-AN. A sample report format is shown in Attachment C. Reports should be sent to:

General Services Administration
Information Resources Management Service
Acquisition Reviews Division (KMA)
18th and F Streets, NW
Washington, DC 20405
Telephone: FTS/Commercial (202) 501-1126

d. Agency policies and procedures should reflect Government wide requirements to include energy-saving features in new computer acquisitions where practical and where products are commercially available.

e. Section 3021 of the Energy Policy Act of 1992 requires affected agencies, to the extent practical, to award at least 10 percent of the amount obligated for competitively awarded contracts and subcontracts under the Act to small disadvantaged business or women-owned small business concerns, historically black colleges and universities, or colleges and universities having a student body that exceeds 20 percent Hispanic Americans or Native Americans. Agencies should coordinate with their

appropriate small business office for guidance in implementing this section of the Energy Policy Act of 1992 for appropriate qualifying procurements.

12. Acquisition considerations.

a. Some computer equipment is not covered under the current EPA Energy Star Computers Program and is thus exempt from Executive Order 12845. Included in this category is equipment such as minicomputers, mainframe computers, and their associated high-speed peripherals, (i.e. high-speed line printers). Mainframe computer terminals are also not covered by the Executive Order. Energy star qualifying mainframe computer terminals (monitors) are available from several manufacturers, however, and agencies should include Energy Star qualification as an evaluation criteria when specifying mainframe terminals.

b. There are also types of computer equipment which technically fall under the current Energy Star program, but for which there are currently few qualifying products. This includes file servers, workstations and X-terminals. It is anticipated that there will be Energy Star models of this equipment in the future; but in the near term, agencies will not be required to specify Energy Star qualification when purchasing these items. Agencies should include Energy Star as an evaluation criteria when soliciting bids for these products. As Energy Star qualified equipment becomes more widely available, agencies will be required to specify Energy Star compliance when procuring these items. Agencies should periodically review their exemptions with the purpose of bringing all their purchases into compliance with Executive Order 12845. Special equipment for personnel with disabilities that exceeds Energy Star requirements should be processed as an exemption under Executive Order 12845.

c. When determining whether to acquire energy efficient computer equipment, energy savings should be calculated to assess the impact of the equipment and whether there is a significant cost differential between the potential energy savings and any additional costs associated with the new equipment. Attachment B provides power levels and energy costs for typical computer equipment to aid in this analysis.

d. As existing contracts are extended or modified, agencies should add requirements for Energy Star microcomputer equipment, if possible. If Energy Star specifications are added to an existing contract for computer equipment, and if the Government changes are within the scope of the contract, the contract does not have to be recompeted.

e. Agencies should seek to modify existing contracts with Energy Star requirements as soon as practicable. On October 1, 1994, to the extent permitted by law, all contracts or solicitations must have specifications for Energy Star or energy-efficient computer equipment as stated in Executive Order 12845.

13. Other programs on energy efficiency.

a. DOE Industry Testing and Information Program. The Energy Policy Act of 1992 directs DOE to support a voluntary national testing and information program for office equipment that is widely used and offers a significant potential for energy savings. DOE test procedures and information dissemination are designed to allow purchasers to make informed decisions about the energy use, energy costs, and potential savings of alternative products. For more information, contact the DOE Building Technologies Office at (202) 586-1689.

b. Energy-Efficient Office Technology Consortium. Several large Government and corporate purchasers of office equipment in the U.S. and Canada have joined in an informal consortium with industry, electric utilities, state and Federal energy research agencies, and non-profit groups to help improve the energy efficiency of computers, printers, copy machines and other electronic office equipment. For more information, contact the Lawrence Berkeley Laboratory at (202) 484-0880.

JOE M. THOMPSON
Commissioner
Information Resources
Management Services

TECHNICAL GUIDANCE ON ENERGY-EFFICIENCY

1. Introduction. This guidance should be considered when doing a requirements analysis and for the design and operation of microcomputers, monitors, and printers. The system manager or end user using the guidance should recognize that each agency has different mission needs and physical space restrictions that may affect the system design and equipment selected. General energy reducing measures should be considered for all types of FIP equipment.

2. Energy efficiency and system design. Many decisions made when designing a system can greatly affect energy usage. Considering energy-saving features in the initial system design should lead to selection of the most cost-effective solution. Naturally, performance and cost considerations dominate system design decisions, but Federal regulations require that energy and environmental factors also be considered. Decisions to network, types of equipment to purchase, and where to locate printers and other equipment all affect total energy usage. The following provides more information about these issues.

a. Networking Microcomputers and Peripherals. As indicated below, LANs can reduce total system energy consumption by allowing more efficient use of equipment through sharing of peripherals; allowing users to communicate electronically rather than with paper; and providing centralized power management of equipment on the LAN.

(1) A well-designed LAN can allow many people to share peripheral devices. Allowing multiple users to access peripherals such as printers, scanners and external storage systems should provide adequate performance with a lower number of devices. This will usually save money and reduce operating costs as well as decrease energy costs.

(2) Electronic mail and other forms of electronic transmission of information can reduce energy costs for printing and copying.

(3) Use of non-display microcomputers as file servers can save several hundred dollars on equipment and electricity costs over the lifetime of each server. Also, a monochrome monitor or less powerful monitor can be used for a file server or microcomputer when a color monitor is not absolutely required.

Recently introduced multi-function equipment, such as front-end facsimiles for laser printers or a combination personal printer and scanner or copier, can, in most cases, save substantial amounts of energy, and reduce both initial and maintenance costs.

b. Microcomputers and monitors.

(1) Microcomputers and monitors should meet all performance requirements and be able to automatically power-down and recover from a power level of 30 watts or less each, unless the equipment always meets these low-power levels when not in use. Equipment should be shipped to the agency with the power management feature(s) enabled. Energy-saving features should be designed to work in the agency's specific computing environment (i.e., a given operating system and type of network, etc.). Some products that qualify for the Energy Star program may use manufacturer-specified software. Some models may meet Energy Star power levels in a standalone or base configuration, but not in the configuration required by the agency. Therefore, agencies should specify products that meet the Energy Star-defined power requirement when used under agency-specified conditions.

(2) Notebook computers almost always meet Energy Star requirements, but are generally more expensive than similarly capable desktop microcomputers. Notebooks can be cost-effective substitutes for desktop computers, especially for employees who travel. Notebook computers, however, often have smaller screens, poorer keyboards and less expendability. To counteract these deficiencies, docking stations that have better quality keyboards and monitors plus a LAN connection capability are available for use with notebook computers. If a monitor and docking station are used, they must have power management features if the energy saving capabilities of a notebook computer are to be retained. Purchasers considering this option should ensure that the notebook computer and docking station meets their other performance needs, such as speed, storage, and versatility.

(3) Color flat panel monitors can save at least 50 percent of the energy that traditional CRT monitors use in full power operation. The visual quality of active-matrix color LCD monitors is comparable to CRT monitors. LCDs take up much less desk space, and usually don't need a low-power mode because they use less than 30 watts of power. Because of some of these unique features, an Energy Star-labeled LCD could be selected over an Energy Star-labeled CRT.

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Attachment A

c. Printers. Printers are not in use most of the time they are on. Wasted power consumption during this idle state could have a significant impact on overall energy use and operating costs. Several manufacturers have laser printers with a low-power idle mode in addition to a normal standby mode. This low-power feature can reduce the energy used by laser printers by one-half, without adding to the cost of the unit or inconveniencing users.

(1) A typical eight pages per minute laser printer might consume about 400 watts printing, and 85 watts in standby mode. If this printer does not have an additional low-power idle mode, it probably consumes 400 kwh/yr of electricity at a cost of almost \$25 per year to operate. A similar laser printer, having an additional low-power energy-saver mode as specified by the Energy Star Computers program, would consume about 45 percent less energy and should provide significant savings in power usage over other non-equipped printers. Energy Star-qualifying products that meet the following default times or power down to low-power states and maximum power consumption in low-power mode are required by Executive Order 12845.

Printer Speed (Pages per Minute)	Default Time to Low- Power State (Minutes)	Maximum Power Consumption in Low- Power State (Watts)
1-7	15	30
8-14	30	30
15 and above, and color lasers	60	45

(2) One of the most effective ways to reduce printer energy consumption is to connect several microcomputers to one printer rather than using one printer per microcomputer.

(3) Inkjet printers are a good Energy Star qualifying alternative in some applications, especially for single-users. Inkjet print quality is often very good, and an inkjet's speed is comparable to a slow laser printer. Inkjet printers use less energy than laser printers, approximately 120 kwh/yr -- 50 percent less than a laser printer with a sleep mode.

d. Other Considerations.

(1) Reliability of energy-efficient equipment. Manufacturers have indicated that reliability will not be adversely affected by improvements in energy-efficiency or power management. Some vendors suggest that components that are designed to be cycled often may have a longer useful lifetime with power-managed equipment. Others note that some equipment such as monitors may yield a longer useful life by being turned off when not in use, as compared to the same monitor being left on 24 hours each day (i.e., if the rated life is a certain number of years, running it constantly wears it out faster).

(2) Reducing building energy requirements. Building energy issues should be thoroughly considered in the system design process. Also, when an agency contracts for development or operating services, it should separately identify tasks involving system wide energy use, including impacts on electrical service, power quality, and heating, ventilation and air conditioning systems.

(3) Any software developed or purchased should be compatible with the hardware power management features of the equipment.

3. Energy-Efficiency and Equipment Operation. A key component in reducing energy consumption is educating LAN administrators, end users and system managers on energy-efficient practices. The following are some of the major areas that should be emphasized:

a. Turning off Computer equipment during periods of non-use.

(1) Energy consumption of a microcomputer can be reduced by more than 75 percent by turning off the machine during non-work hours. A microcomputer operated only during normal working hours uses about 300 kwh/yr, as opposed to 1,314 kwh/yr if left on all the time. Turning a microcomputer off at night can save approximately \$60 per year. If 5,000 users turned off their computer equipment at night, it could save taxpayers approximately \$300,000 each year.

(2) Users should turn off microcomputers, monitors printers, and external modems (which are not connected to electronic mail applications) whenever they leave the office for any extended period of time when it will not be inconvenient to reboot or restart.

(3) For shorter absences, users should turn off just the monitor. This will reduce the unit's power consumption about 50 percent and not require a computer reboot to return to work.

b. Optimizing power-management capabilities.

(1) Manufacturers of power-managed microcomputers with the Energy Star logo may have multiple "sleep" or low-power modes that the user can choose from. Another option is the length of time the microcomputer is inactive before it automatically goes to "sleep".

(2) A number of factors need to be considered in setting the power management features for a given type of equipment. These include the actual power used in each active or sleep or standby mode; the patterns of usage, both within an office and between offices for a given piece of equipment; and the time required for the equipment to return to full operating capability and how this might affect user convenience and productivity.

(3) Agency end users should initially set equipment power management features for the shortest delay time before a low-power standby mode is invoked, and the "deepest" sleep (lowest power) mode possible, consistent with user requirements. Users should know how to modify the period of inactivity and "depth" of sleep mode for microcomputers, monitors and printers to reach the maximum level of energy savings to match user requirements.

c. Other operational considerations. Contrary to popular belief, most screen savers do not save energy. They are designed to save phosphors and prolong the usefulness of CRT monitors. They have a negligible impact on energy consumption and should not be installed as an energy-saving device unless the screen saver product actually has a power management feature.

(1) Various after-market devices are available to automatically turn the power off on microcomputers and peripherals. These products allow software control of timing, and "bookmark" features to save data to disk and allow users to easily return to their exact place in the file when returning to full power. These products can turn off computer equipment at night, thereby saving a significant amount of energy.

(2) Power saving products often completely turn off the product (as opposed to putting it into a low-power standby state), meaning that there might be a significant lag time before a user can resume work. Power saving products can be cost effective for some computer equipment and yield significant energy savings. "After-market" power-saving products (e.g., software or power strip connections) may be considered for existing systems to achieve energy savings. While the use of these products on new computer equipment is not encouraged, they may be considered an acceptable alternative to an exemption when bundled with a non Energy Star qualifying product, if the final product meets all of the Energy Star requirements.

Agencies should assess whether or not the energy usage and first purchase costs of these after-market devices makes these devices cost effective for the life-cycle of the computer equipment. Thorough cost/benefit studies should be performed before purchases are made. All analyses should consider the remaining life of the computer equipment.

d. LAN operating tips. Managers should consider the energy implications of various LAN configurations to reduce energy use. For example, a LAN with several Energy Star microcomputers might save energy by allowing the file server to receive electronic messages and facsimiles at night, and distribute them all at once just before users arrive in the morning. Agencies should ensure that, if PC's are used with a file server, the PC's sleep mode functions are compatible with the network so that the PC "wakes up" if it receives a signal from the server. Otherwise, users may be inadvertently disconnected from the network if their system is "idle".

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Attachment B

Energy Power Levels (and Assumed Operating
Cycles) for Typical Computer Equipment

Equipment	Power Level		Hours/Yr		Annual	
	Ready	Standby	Ready	Standby	Usage	Cost
Microcomputer w/o monitor						
Desktop, conventional	75		4300	0	323	\$19.38
Desktop, ENERGY STAR						
Economical	75	30	1000	3300	174	\$10.44
Best Available*	15	8	1000	3300	41	\$2.46
Laptop (notebook)	15	<3	1000	3300	25	\$1.50
Monitor (15")						
CRT, conventional,color	75	4300		0	323	\$19.38
CRT, ENERGY STAR, color						
Economical	75	30	1000	3300	174	\$10.44
Best Available*	60	5	1000	3300	77	\$4.62
CRT, Monochrome	50	30	1000	3300	149	\$8.94
Flat-panel LCD, color#	50	<10	1000	3300	83	\$4.98
Printer						
Laser, conventional	85		4750	0	404	\$24.24
Laser, ENERGY STAR	85	30	1540	3210	227	\$13.62
Inkjet	25	25	1540	3210	119	\$7.14

* Best available model as of November 1993.

Smaller flat panel LCDs use fewer watts in an active mode.

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Attachment C

SAMPLE FORMAT FOR THE ENERGY STAR EXEMPTION REPORT

INTERAGENCY REPORT CONTROL NUMBER 0412-GSA-AN

Agency Name:

Bureau Name:

Acquisition/Contract/RFP Number (or some means of identifying the procurement):

Official's name and position granting the exemption:

Brief description of the equipment being exempted:

Rationale for the exemption (could be text or a code based on Section One of Executive Order 12845):

Identify and list the quantity of equipment being exempted (i.e. IBM PS 2, HP Laserjet IV, etc.):

Energy consumption/rating of the equipment being procured where possible (i.e. watt rating specified for various operating modes):

